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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|------------------|
| 10/761,835 | 01/20/2004 | Jong-Kon Choi | 9903-086 | 4066 |
| 20575 | 7590 | 06/02/2005 | EXAMINER | |
| MARGER JOHNSON & MCCOLLOM, P.C. 1030 SW MORRISON STREET PORTLAND, OR 97205 | | | MITCHELL, JAMES M | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2813 | |

DATE MAILED: 06/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

EV

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|------------------------------|--------------------------------------|---------------------------------------|--|
| Office Action Summary | Application No. 10/761,835 | Applicant(s) CHOI, JONG-KON | |
| | Examiner James M. Mitchell | Art Unit 2813 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 March 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This office action is in response to the amendment filed March 11, 2005.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 3, 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fisher (U.S 5,936,758) in combination with Mullen (U.S. 5,241,133).

Fisher (Fig 1) discloses:

(cl. 1) a digital micro-mirror device (14; Col. 5, Lines 45-48) package, comprising: a base substrate (46) having a top surface and a bottom surface; an adhesive disposed on the top surface of the base substrate; a semiconductor chip (12) over the adhesive, and electrically connected (24) with the base substrate; one or more mirrors (14; Col. 5, Lines 45-48) mounted on the semiconductor chip; a hermetic sealing means (Abstract) covering the semiconductor chip including the one more mirrors;

(cl. 3) with the board ceramic (Col. 5, Lines 65-66);

Fisher does not show a copper metallic layer disposed between the semiconductor chip and a metallic adhesive.

Mullen (Fig 6) utilizes a copper metallic layer (60) between a chip (64) and adhesive (68).

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It would have been obvious to one of ordinary skill in the art to modify the package of Fisher by incorporating a copper metallic layer between the chip and adhesive in order to reduce stress as taught by Mullen (Col. 4, Lines 41-42).

Mullen does not appear to explicitly show that its adhesive is metallic or that its solder.

However, Zhao teaches that solder is an adhesive (Col. 7, Lines 16-17).

It would have been obvious to one of ordinary skill in the art to form the adhesive in the modified stress reducing structure taught as taught by Mullen with solder in order to form an adhesive as required by Mullen (68).

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fisher (U.S. 5,936,758) and Mullen (U.S. 5,241,133) as applied to claim 1 and further in combination with Akram (U.S. 2001/004564).

Neither Fisher nor Mullen utilizes a heat sink attached on the bottom surface of the base substrate.

Akram (Fig. 10) utilizes a heat sink (340) attached on the bottom surface of the base substrate.

It would have been obvious to one of ordinary skill in the art to incorporate a heat sink attached on the bottom surface of the base substrate of the modified structure including Fisher in order to provide heat management as taught by Akram (Col. 7, Lines 57-60).

Claims 1 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Coyle (U.S.2001/0034083) in combination with Ommen et al. (U.S. 5,397,917).

Coyle (Fig 4A, 5A, 6A) discloses:

(cl. 1) a digital micro-mirror device package, comprising: a base substrate (201) having a top surface and a bottom surface; an adhesive disposed on the top surface of the base substrate (Par. 0057); a semiconductor chip (101) over the adhesive, and electrically connected (wires not labeled) with the base substrate; one or more mirrors (102) mounted on the semiconductor chip; a cap (601) covering the semiconductor chip including the one more mirrors;

(cl. 3) and the board consist of plastic (Par. 0055).

Coyle does not show a hermetic seal or copper metallic layer disposed between the semiconductor chip and a metallic adhesive.

Ommen utilizes a hermetic seal (Col. 7, Lines 35-36) and a copper metallic layer (Col. 2, Lines 40-42) between a chip (25) and adhesive (17).

It would have been obvious to one of ordinary skill in the art to modify the chip attaching and covering means of Coyle by incorporating a hermetic cap and copper metallic layer between the chip and adhesive in order to provide an heat spreader as thereby dissipating heat and to prevent moisture penetration as taught by Ommen (Abstract & Col. 7, Lines 35-36).

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Claims 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Coyle (U.S.2001/0034083) and Ommen et al. (U.S. 5,397,917) as applied to claim 1 and further in combination with Gondunsky et al. (U.S. 5,050,040).

Neither Coyle nor Ommen appear to show a heat sink attached to a bottom of the board.

Gondunsky (Fig.1) utilizes a sink (30) attached to a bottom of a board.

It would have been obvious to one of ordinary skill in the art to form a sink attached to a bottom of the modified board of Coyle in order to facilitate heat from a heat dissipating member as taught by Gondunsky (Col. 8, Lines 39-40).

Response to Arguments

Applicant's arguments with respect to claims have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The prior art most notably shows in: Riley (U.S. 5,856,911) and Jamieson (U.S. 6,545,351) the use of a sink attached to a bottom of a board.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

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§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James M. Mitchell whose telephone number is (571) 272-1931. The examiner can normally be reached on M-F 8:00-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr. can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jmm
May 25 2005

Carl Whitehead, Jr.
CARL WHITEHEAD, JR.
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800